must conclude that the local reservoir of an individual volcano is supplied by drafts from some much larger body of rock magma with which it is from time to time in communication. The various types of igneous intrusion are then considered, especial attention being paid to the numerous varieties of laccolitic and bathylitic intrusion. The important question of petrographical provinces and the mutual relations of associated igneous rocks are discussed at length. While recognizing many local and subordinate petrographical provinces, Mr. Harker distinguishes two petrographical regions of the first order of magnitude, an Atlantic and a Pacific region, the two being separated in America by the line of the Andes and Cordillera folding. The former region is characterized by a prevalence of magmas rich in alkalis, while in the magmas of the latter, lime and magnesia are relatively more abundant. The mutual relations of the magmas in a number of well-known igneous areas within these great petrographical regions is then considered and is illustrated by the aid of variation diagrams.

A very interesting and valuable portion of the book is that in which the physical chemistry of rock magmas and the laws which govern their crystallization is considered. In this results of the recent researches of Vogt, Miers, Day, Doelter and others are presented and critically discussed. The structures of igneous rocks are also considered in the light of recent work in the field of physical chemistry. Thus in hypabyssal porphyritic rocks, the phenocrysts often represent the excess over eutectic proportions and the ground mass the quasi eutectic residuum, while in the volcanic rocks the distinction is obscured by the effects of the discontinuous change of physical conditions at the time of extrusion. Micrographic intergrowths, corona, spherulitic and variolitic structures are explained in the light of the laws of crystallization as elucidated by recent studies in physical chemistry.

The function of mineralizers in rock magmas and the formation of certain minerals through their agency is then discussed, leading to the consideration of the active rôle of the volatile constituents, which on the crystallization of the rock enter upon a new phase of activity, partly of a destructive kind to which Bunson applied the term *pneumatolitic*. Then follows the consideration of the metasomatic changes developed in certain rocks when penetrated by igneous intrusions, more especially the phenomenon termed "granitization" by the French geologists.

The very important question of magmatic differentiation in its various phases is then considered, together with the allied question of hybridism in igneous rocks to which Harker has recently made such important contributions as the result of his studies in the western islands of Scotland.

The last chapter deals with the question of the classification of igneous rocks. The "quantitative system" is adversely criticized and the opinion is expressed that a satisfactory classification can not be expected until our knowledge in the domain of petrogenesis is much more extended than it is at present.

The work traverses a portion of the field of geological knowledge which is not covered by our ordinary text-books, although many of the questions discussed are also treated of in the first volume of Professor Iddings's work on "Igneous Rocks," which has just appeared. It is well and clearly written and will repay a careful perusal by all interested in the modern developments of the science of geology.

McGILL UNIVERSITY FRANK D. ADAMS

Croisière Océanographique accomplie a bord de la Belgica dans la Mer du Grönland, 1905. DUC D'ORLÉANS. Bruxelles, 1907. 4to, 573 pp., 80 plates and charts.

In June, 1905, the Duke of Orleans, having in view a study of the Greenland Sea, sailed from Tromsö, Norway, in the well-known steamer *Belgica,* commanded by A. de Gerlache de Gomery, accompanied by an effective staff. The season being too early for navigation on the Greenland coast the course of the expedition was laid first to the northward by Bear Island, the west and north coasts of Spitzbergen, and then as closely as opportunity permitted skirted the compact southward

extending Arctic pack ice in the hope of finding a passage toward the eastern shore of Greenland through some break in this impassable barrier. Nearly seven degrees of southing were traversed before the *Belgica* could be headed to the westward and, amongst the broken floe ice between the pack ice and the Greenland coast, again struggle to the northward. Under these circumstances a latitude of about 78° 16′ was attained, when the ship retraced her course, leaving the broken ice at a point nearly west of Jan Mayen and thence proceeding to the westward of Iceland, touching at Reykjavik, and so homeward.

Among the special objects of the cruise was the extension and confirmation of Nansen's observations and theories in regard to the conformation of the sea bottom, the currents off the east coast of Greenland, the distribution of marine animal life in the plankton and on the surface of the sea, and the inter-relations of Arctic and North Atlantic waters mingling in the Greenland Sea.

The scientific results are detailed in this truly magnificent volume, in which, of the printer's and cartographer's art, nothing has been spared in the endeavor to approach perfection.

Geographically the more interesting results were the latitude attained by the vessel, a considerable distance further than previous navigators on this dangerous coast; the discovery of a number of new islands off the coast of Greenland; and of a submarine moraine, about forty miles broad-off the Greenland coast and parallel with it, which received the name of Belgica Bank.

Space would not suffice to analyze in detail the work accomplished, but a summary of the contents will enable those interested to form a general idea of the results.

A summary, with synoptical charts of the meteorological conditions during the cruise, is given by Dan La Cour. O. B. Böggild contributes a memoir on the submarine sediments and their distribution, with notes on the submarine moraine before referred to and the continental rocks collected. Ostenfeld, C. Jensen, Ferdinandsen, Winge and Deichmann Branth discuss the phanerogams, mosses, fungi and lichens obtained. Helland-Hansen and Koefoed discuss the hydrography in a division of 220 pages luxuriously illustrated by maps and sections, and more than 100 pages are given to a study of the plankton by Koefoed and others. C. Hartlaub contributes a memoir on the medusæ, and Koefoed one on the fishes with fine illustrations of numerous larval forms. J. Grieg describes the invertebrates collected, first on the coast of Spitsbergen and, secondly, from the Greenland Sea, with the assistance of several other naturalists who have determined the species of special groups. Some observations follow on the food of the walrus, bearded seal, *Tringa striata,* and the tom cod. The volume closes with tables of the dredging stations, an enumeration of the scientific staff of the expedition, and a full table of contents; but curiously enough, no index.

This splendid volume, with its wealth of carefully conducted observations, will form a permanent monument to the liberality and good sense of the noble patron of the expedition and a happy contrast to the barren exploits of unscientific pole seekers with which from time to time the daily press concerns itself.

Wm. H. Dall

SPECIAL ARTICLES

PRELIMINARY NOTE ON THE CHROMOSOMES IN THE OOGENESIS, FERTILIZATION AND CLEAVAGE OF CERTAIN HEMIPTERA

In the recent work on the spermatogenesis of the Hemiptera heteroptera it has been shown that in the members of some families of this group, notably the Coreidæ, the spermatogonia have an odd number of chromosomes, one of the latter being the unpaired idiochromosome or "accessory" chromosome. Owing to the fact that this chromosome passes undivided to one pole of the spindle in one of the maturation mitoses while the others divide equally in both, two classes of spermatozoa are formed in equal numbers, one class having the idiochromosome, the other lacking it. The oogonia have been shown to have an even number of chromosomes, there being two equal